Decision Models & Analytics

Syllabus, Spring 2026

INSTRUCTOR Professor Ilan Lobel
Office Hours: Mondays 2PM-3PM at KMC 8-71
ilobel@stern.nyu.edu

TA TBD

COURSE OBJECTIVE

One of the most crucial skills for a modern manager is knowing how to use data to make decisions. In Decision Models & Analytics, you will learn how to use modern analytics tools, such as optimization and simulation, to solve complex business problems. For whatever career you are pursuing, knowing how to model and solve complex problems will make you a more effective decision-maker and give you a competitive edge. This is a hands-on, Excel-based, lab-style class.

The aim of the course is to be useful to a wide array of industries and functional areas, including tech, consulting, finance, government, human resources, operations or marketing. In this spirit, the course will cover a wide range of application areas, including finance problems (portfolio optimization, real estate investing, discounted cash flow valuation), operations problems (supply chain management, workforce management, inventory management, and project management), and marketing problems (demand estimation, pricing, and online advertising).

COURSE CONTENTS

Deterministic Models
Linear Optimization – Optimization modeling, sensitivity analysis, multi-period modeling.
Integer Optimization – Binary variables, logic modeling, project selection, facility location.
Network Optimization – Min cost flow, max flow, shortest path, network design.
Non-linear Optimization – Portfolio optimization, demand estimation, pricing.

Probabilistic Models
Stochastic Optimization – Inventory optimization.
Simulation – Basic concepts, Crystal Ball software, financial planning.
Simulation and Optimization – project management, revenue management.

TEXTBOOK

The textbook is *Practical Management Science* (6th edition), by Winston and Albright. You are not required to buy it (it's optional).

PRE-REQUISITES

Although there are no specific pre-requisites for this class, prior knowledge of basic probability concepts (probability distributions, percentiles, expected value, standard deviation, variance and covariance) would be helpful.

WEBSITE

Brightspace will be used as the main communication tool, and materials will be posted in the system. This includes the homework assignments, the problems studied and the problem solutions.

GRADING

At NYU Stern we seek to teach challenging courses that allow students to demonstrate differential mastery of the subject matter. Assigning grades that reward excellence and reflect differences in performance is important to ensuring the integrity of our curriculum. In general, students in this elective course can expect a grading distribution where about 50% of students will receive A's for excellent work and the remainder will receive B's for good or very good work. In the event that a student performs only adequately or below, he or she can expect to receive a C or lower. The actual distribution for this course and your own grade will depend upon how well each of you actually performs in this course. The grades for this course will be based on homework assignments (30%), midterm exam (30%), final exam (30%) and class participation (10%).

If a student feels that an error has been made in the grading of an assignment or in assessing an overall course grade, a request to have that the grade be re-evaluated may be submitted. Students should submit such requests in writing to the professor within 7 days of receiving the grade, including a brief written statement of why he or she believes that an error in grading has occurred.

CLASS PARTICIPATION

The professor will judge class participation on the extent to which you appear prepared, the relevance and depth of your comments, the degree to which you listen carefully and respond to your peers, and your willingness to take chances in order to further the educational experiences of others. You will lose participation points if you miss classes or arrive late or leave early repeatedly.

HOMEWORK

There are five homework assignments in total. All assignments will be posted on Brightspace. Late assignments will not be accepted unless due to documented serious illness or family emergency. The professor will make exceptions for religious observance or civic obligation when the assignment cannot reasonably be completed prior to the due date and the student makes arrangements for late submission with the professor in advance. You can collaborate with a single colleague in solving the homework questions, but you must acknowledge that in your submission. The assignments must be submitted individually in order to receive credit. All modeling questions require both a math model and an Excel model to be submitted.

ELECTRONIC DEVICES

For every lecture, you will need to bring a computer with Microsoft Excel installed in it, with the Solver add-in pre-loaded. You will also need to access the Apps@Stern server (apps.stern.nyu.edu). Cell phones are a disturbance to both students and professors. Therefore, all electronic devices must be silenced prior to the start of each lecture.

SCHOOLWIDE RULES AND GUIDANCE

Student Accessibility
If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course (or as soon as your need arises) and provide a letter from the Moses Center for Student Accessibility (212-998-4980, mosescsa@nyu.edu) verifying your registration and outlining the accommodations they recommend. For more information, visit the CSA website:
https://www.nyu.edu/students/communities-and-groups/student-accessibility.html

Student Wellness
Classes can get stressful. I encourage you to reach out if you need help. The NYU Wellness Exchange offers mental health support. You can reach them 24/7 at 212 443 9999, or via the "NYU Wellness Exchange" app. There are also drop in hours and appointments. Find out more at:
http://www.nyu.edu/students/health-and-wellness/counseling-services.html

Name Pronunciation and Pronouns
NYU Stern students now have the ability to include their pronouns and name pronunciation in Albert. I encourage you to share your name pronunciation and pronouns this way. Please utilize this link for additional information: Pronouns & Name Pronunciation

Religious Observances and Other Absences
NYU's Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. You must notify me in advance of religious holidays or observances that might coincide with exams, assignments, or class times to schedule mutually acceptable alternatives. Students may also contact religiousaccommodations@nyu.edu for assistance.

NYU Stern is committed to ensuring an equitable educational experience for all students regardless of identity or circumstances and strives to recognize the obligations its students have outside of Stern. Please review all class dates at the start of the semester and review all course requirements to identify any foreseeable conflicts with exams, course assignments, projects, or other items required for participation and attendance. If you are aware of a potential conflict, please contact me as soon as possible to discuss any potential conflicts to determine whether/how they can be accommodated.

Inclusion Statement
This course strives to support and cultivate diversity of thought, perspectives, and experiences. The intent is to present materials and activities that will challenge your current perspectives with a goal of understanding how others might see situations differently. By participating in this course, it is the expectation that everyone commits to making this an inclusive learning environment for all.